

OCCURRENCE OF *ONTHOPHAGUS NUCHICORNIS* (COLEOPTERA: SCARABAEIDAE) IN NORTH DAKOTA.¹

Paul P. Tinerella, Gerald M. Fauske²

ABSTRACT: The present distribution of *Onthophagus nuchicornis* in North Dakota and historical information on its spread through the state is presented. An identification key to the *Onthophagus* sp. of the Dakotas is provided.

Introduction of select saprophagous Scarabaeidae took place in North America for livestock fecal reduction in pasture lands (Fincher 1981). In most cases, introductions were intentional, however, in the case of *Onthophagus nuchicornis* (Linnaeus) this introduction is believed to have been accidental. Documentation of the early introduction and subsequent spread of *O. nuchicornis* is recounted by Brown (1940). He noted that it was described as *O. rhinoceros* Melsheimer in 1844 from Pennsylvania and that it was also reported in 1881 by Henshaw from the Magdalen Islands. This dual eastern and western introductions and the subsequent distribution of *O. nuchicornis* were mapped by Howden (1966). A recent review of the spread of adventive scarabs in North America was provided by Hoebeke and Beucke (1997). This review documented the inland dispersal of *O. nuchicornis* from its points of introduction; however, no records were provided from the northern Great Plains, yet specimens of *O. nuchicornis* were present in the North Dakota State Insect Reference Collection (NDSIRC).

This report is based on 198 specimens of *O. nuchicornis* collected from 1981 through 1996. These records represent new distribution points for North Dakota. Discussed below are the chronology of these records and the inferred spread of *O. nuchicornis* in the northern Great Plains. Because existing regional keys omit one or more species of *Onthophagus* Latreille known from North and South Dakota (Helgesen and Post 1967, Ratcliffe 1991), a key is provided for the identification of *Onthophagus* from the Dakotas.

ESTABLISHMENT OF *ONTHOPHAGUS NUCHICORNIS* IN THE DAKOTAS.

Two historical markers exist as starting points in this investigation: Helgesen and Post (1967) and Kirk and Balsbaugh (1975). Helgesen and Post provided an identification guide to the saprophagous Scarabaeidae of North Dakota, and included three species of *Onthophagus* – *hecate* (Panzer), *orpheus* (Panzer), and *pennsylvanicus* Harold. Kirk and Balsbaugh compiled a list of South Dakota

¹ Received May 23, 1998. Accepted July 4, 1998.

² Department of Entomology, North Dakota State University, Fargo, ND 58105

beetles, and recorded five species of *Onthophagus* – *cynomysi* Brown, *hecate*, *orpheus*, *pennsylvanicus*, and *striatulus* (Beauvois)³. Neither work listed *O. nuchicornis*.

Helgesen and Post (1967) targeted the scarabs, their publication being the culmination of a statewide two year survey combined with NDSIRC and literature records. Their work can be taken as evidence lending support to the idea that *O. nuchicornis* was not present in North Dakota prior to 1967. Little active scarab beetle collecting was done in North Dakota from 1974 through 1992. However, during that time period the first known North Dakota specimen of *O. nuchicornis* was collected from Cass County in 1981.

Use of the Balsbaugh and Kirk (1975) list as a benchmark is more problematic as there was no statewide survey of the Scarabaeidae. Records given in that work were based upon the literature, specimens present in the collection of the senior author of that work, and those from the Severin-McDaniel [formerly H.C. Severin] Insect Research Museum (SMIM) at South Dakota State University.

With respect to scarab beetles, collection records for South Dakota were sporadic from 1956 through the late 1980's; *O. nuchicornis* was not reported by Kirk and Balsbaugh (1975), nor are there specimens in the SMIM. Another species, *O. cynomysi*, was reported in the Kirk and Balsbaugh list and probably collected in the '60's or early '70's – just prior to the time when we would expect the first records of *O. nuchicornis* from South Dakota. Unfortunately these specimens have not been located in either the SMIM or USNM insect collections. Data for the *O. cynomysi* specimens are as follows. Specimens were taken at Chamberlain, South Dakota, in September – no year of collection was given by Balsbaugh and Kirk (1975). Those specimens were identified by Cartwright. Howden and Cartwright (1963) revised the North American species of *Onthophagus*, but gave only New Mexico and Oklahoma localities for *O. cynomysi*.⁴ This is supporting, but not conclusive, evidence that *Onthophagus cynomysi* was collected between 1963 (Howden and Cartwright revision) and 1975 (Balsbaugh and Kirk list). Relating back to the use of the Kirk and Balsbaugh list as a benchmark: *O. nuchicornis* was not reported from South Dakota by 1975, there are no specimens in the SMIM, *O. cynomysi* was reported from the state – probably in the 1960's or early 1970's – just prior to the expected appearance of *O. nuchicornis*, and Paul Johnson (personal comm.) informs us that he has seen *O. nuchicornis* from South Dakota – 1990's, but this is after the crucial time of its spread into the Northern Great Plains.

³ Reported by Kirk and Balsbaugh (1975) as "*Onthophagus janus* Panzer." This name, original combination *Scarabaeus janus* Panzer 1794, is a primary homonym of *Scarabaeus janus* Olivier 1789. *Onthophagus* [*Copris*] *striatulus* (Beauvois) 1809 is the oldest available replacement name (Howden & Cartwright 1963).

⁴ Note that *O. cynomysi* was not listed by Ratcliffe (1991) from Nebraska or by McNamara (1991) from Canada.

SPREAD OF *ONTHOPHAGUS NUCHICORNIS* ACROSS NORTH DAKOTA

Based on chronological sequence and collection history of the state, we believe the records contained in the NDSIRC can be used to reconstruct the westward expansion of *O. nuchicornis* across North Dakota. The presence of *O. nuchicornis* in Minnesota was established with records reported by Hoebeke and Beucke (1997). We report here two specimens collected in 1975 from Ottertail County, Minnesota. These collections predate other published records by four years, and thus serve to confirm the presence of *O. nuchicornis* in western Minnesota prior to the first North Dakota records. The earliest known North Dakota records are two specimens collected in a sunflower extract trap from Cass County, during 1981.

The westward expansion of *O. nuchicornis* (fig. 1) can be inferred from subsequent North Dakota records. In 1982, one specimen was collected from a fecal pat in Ransom County. In 1983 and 1984, small series' were taken again in fecal pats collected from Ransom County (see below for chronological collection data). In 1984, the first records were collected from Richland County by the

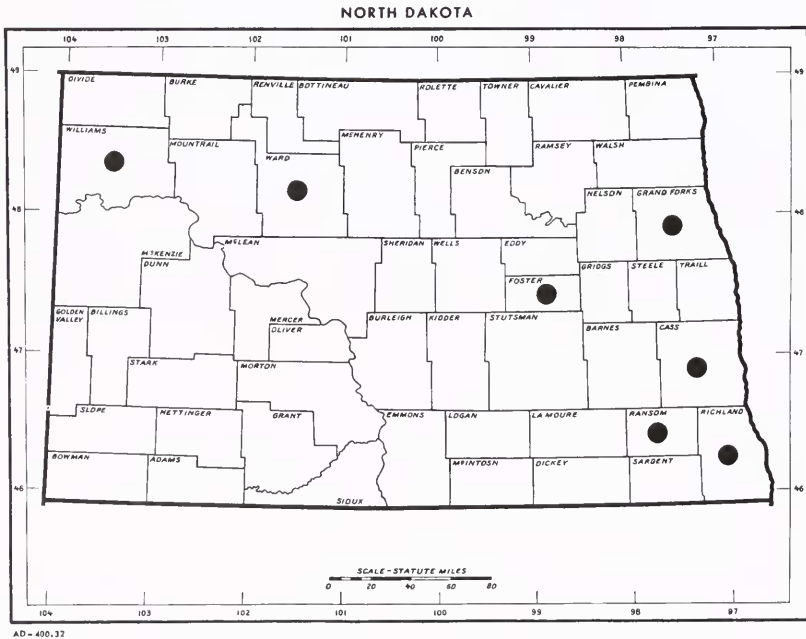


Figure 1. Known distribution of *Onthophagus nuchicornis* in North Dakota.

same means (this series yielded the greatest number of specimens of *O. nuchicornis* collected in the state prior to 1990). In 1987, Ward and Williams County specimens were collected in pitfall traps from agricultural study plots near Minot and Williston, respectively. These far western locality records were obtained over the span of a single field season. Low numbers collected from these sites probably indicate the recent arrival of *O. nuchicornis* and may be analogous to the pre-1990 low numbers from southeastern North Dakota. Though active collecting in the state at that time was highly sporadic, specimens were still recorded from various locations.

The continued westward expansion of *O. nuchicornis* is indicated by the eastern Montana collection data furnished by Mike Ivie (personal comm.) from the Montana Entomology Collection (MTEC). Specimens have been reported from Richland and Roosevelt counties in northeastern Montana. These records, from 1992 and 1994, respectively, mesh well with the 1987 data from Ward and Williston counties of North Dakota. There are numerous records of *O. nuchicornis* from western Montana which are apparently disjunct from the eastern records. This data correlates well with the hypothesized dual introduction of *O. nuchicornis* into North America.

NORTH DAKOTA RECORDS (Fig. 1): Cass Co.: 9-VII-1981, (2); Foster Co.: [10-17]-VI-1994, (2), [10-17]-X-1994 (2); Grand Forks Co.: 31-V-1993, (3); Ransom Co.: 31-VIII-1982, (1), 16-VIII-1983, (2), 16-V-1984, (3), 17-IX-1984, (1), 9-IV-1993, (5); Richland Co.: 30-V-1984, (10), 11-VIII-1992, (33), 12-VIII-1992, (74), 13-VIII-1992, (1), 17-VIII-1992, (9), 21-VIII-1992, (15), 27-VIII-1992, (18), 21-V-1993, (1), 28-V-1993, (2), 24-IX-1994, (1), 16-IX-1996, (4); Ward Co.: 14-VI-1987, (1); Williams Co.: 26-VI-1987, (2), 28-VI-1987, (4), 10-VIII-1987, (2).

Key to the species of *Onthophagus* recorded from the Dakotas.

- 1. Disc of pronotum granulate-tuberculate2
- 1.' Disc of pronotum punctate3

- 2. Elytral intervals and spaces between tubercles alutaceous and opaque, tubercles and elytral striae shining. Pastures throughout the Dakotas *O. hecate* (Panzer)
- 2.' Elytral intervals and spaces between tubercles shining black to aeneous, concolorous with tubercles and elytral striae. Prairiedog burrows, SD only *O. cynomyisi* Brown

- 3. Disc of pronotum and elytra shining metallic green, length > 5.2 mm *O. orpheus* (Panzer)
- 3.' Disc of pronotum and elytra not shining metallic green, length variable4

4. Elytra yellow-brown mottled with black, contrasting with black pronotum, major male with median cephalic horn *O. nuchicornis* (Linnaeus)
- 4'. Elytra may be pale at humeri, never mottled and not contrasting with pronotum when latter is black, major males with supra-orbital horns or without cephalic horns. 5
5. Shining; Second and third elytral intervals with three rows of setae, major male with supra-orbital horns, female with supra-orbital ridge distinctly elevated; pronotum in both sexes elevated dorsally, length (usually) >5.1 mm *O. striatulus* (Beauvois)
- 5'. Alutaceous; Three rows of setae present at base of second elytral interval only, major male without horns, both sexes with reduced supraorbital carina; pronotum completely rounded; length < 5.1 mm *O. pennsylvanicus* Harold

ACKNOWLEDGMENTS

We wish to thank David A. Rider and Robert B. Carlson, (North Dakota State University), for their helpful review comments. We thank Paul Johnson, (South Dakota State University), for assistance in searching for additional records and for his review of the manuscript. Appreciation is also extended to Michael A. Ivie, (Montana State University) for providing collection records from Montana. Finally, thanks are extended to Paul K. Lago (Mississippi State University), for helpful comments and review of the manuscript.

LITERATURE CITED

- Brown, W. J.** 1940. Notes on the American distribution of some species of Coleoptera common to the European and North American continents. *Can. Entomol.* 72 (4): 65-78.
- Fincher, G.T.** 1981. The potential value of dung beetles in pasture ecosystems. *J. Ga. Entomol. Soc.* 16 (Suppl.): 316-333.
- Helgesen, R. G. and R. L. Post.** 1967. Saprophagous Scarabaeidae (Coleoptera) of North Dakota. *N.D. Insects – Schafer-Post Series.* Publ. No. 7. 60 pp.
- Hoebeke, E. R. and K. Beucke.** 1997. Adventive *Onthophagus* (Coleoptera: Scarabaeidae) in North America: geographic ranges, diagnoses, and new distribution records. *Entomol. News* 108(5): 345-362.
- Howden, H. F.** 1966. Some possible effects of the Pleistocene on the Distributions of North American Scarabaeidae (Coleoptera). *Can. Entomol.* 98: 1177-1190.
- Howden, H. F. and O. L. Cartwright.** 1963. Scarab beetles of the genus *Onthophagus* Latreille North of Mexico (Coleoptera: Scarabaeidae). *Proc. U.S. Natl. Mus.* 114: 1-135.
- Ivie, Michael A.** 1998. Personal Communication. Curator, Montana Entomology Collection. Montana St. Univ.
- Johnson, Paul J.** 1998. Personal Communication. Curator, Severin-McDaniel Insect Research Collection. South Dakota St. Univ.
- Kirk, V. M. and E. U. Balsbaugh, Jr.** 1975. A list of the beetles of South Dakota. *S. D. St. Univ. Expt. Sta. Tech. Bull.* 42. 139 pp.
- McNamara J.** 1991. Family Scarabaeidae (Scarab beetles) pp. 145-158 In: Y. Bousquet, (ed.). Checklist of the beetles of Canada and Alaska. Research Branch, Agric. Can. Publ. 1861/E. 430 pp.
- Ratcliffe, B. C.** 1991. The Scarab beetles of Nebraska. *Univ. Nebraska St. Mus. Bull.* Vol. 12. 333 pp.